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# PATENT SPECIFICATION

Application Date: April 13, 1928. No. 10,955/28.

320,599

Complete Left: Feb. 11, 1929.

Complete Accepted: Oct. 14, 1929.

PROVISIONAL SPECIFICATION.

## Improvements in or relating to Machines for Cutting or Shredding Tobacco.



We, THE IMPERIAL TOBACCO COMPANY (OF GREAT BRITAIN AND IRELAND) LIMITED, of East Street, Bedminster, Bristol, a British Company, and ALBERT FREDERICK COATES, of Codrington Grange, Broadway Road, Bristol, a British Subject, do hereby declare the nature of this invention to be as follows:—

This invention relates to machines for cutting tobacco of the type in which the material is cut or shredded by a moving cutter as it issues through a mouthpiece.

One of the objects of this invention is to provide a mounting for the cutter that shall not subject the machine to heavy vibrating forces during its operation.

Another object is to provide a cutter that shall operate upon the tobacco with a slicing action instead of with a plain shearing action.

According to one aspect of the present invention the cutter is mounted on a connecting rod coupling two cranks so that it moves with a circular motion in front of the mouthpiece.

Preferably the plane of movement of the connecting rod is inclined to the direction of motion of the tobacco through the mouthpiece, the cutter passing across and in front of the mouthpiece first in one direction to effect the cutting operation, and then in the opposite direction, in which latter case it moves in a path which is spaced from the front surface of the mouthpiece so as not to foul the tobacco that is fed therethrough. In such case the movement of the tobacco through the mouthpiece may be continuous.

If desired means may be provided for adjusting the plane of movement of the connecting rod in order to obtain the best cutting action for each particular feed of the tobacco leaves to be cut.

One constructional form of the present invention will now be described by way of example.

The machine comprises a mouthpiece, and means for feeding tobacco leaves therethrough. A connecting rod couples cranks secured to two parallel shafts rotatably mounted upon the frame of the machine on opposite sides of the mouthpiece, the rotary axes of these shafts being

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inclined at an angle to the direction of motion of the tobacco leaves through the mouthpiece. A blade for cutting the tobacco leaves is mounted on the said connecting rod so that it is set at an angle to the rotary axes of the said shafts.

When the said shafts are rotated the blade is moved in a circular path but without rotation, and the arrangement is such that the blade cuts the moving mass of the tobacco leaves as they issue through the mouthpiece during one portion of its movement, while during its return movement across and in front of the mouthpiece the blade passes clear in front of the said moving mass so as not to foul same.

The mouthpiece may be shaped to correspond substantially with the surface generated by the blade during its cutting action.

Preferably the arrangement is such that towards the end of its cutting action the blade has a considerable component of motion in the direction of its own length in order to effect a slicing cut.

Thus the edge of the blade may be substantially horizontal and the cutting action may take place during the last quarter revolution of the shafts when the blade moves downwardly.

Means may be provided to sharpen the blade while the machine is in operation, such means preferably acting during the upper half revolution of the shafts when the blade is above the mouthpiece.

The blade is downwardly inclined to facilitate clearance during cutting.

Usually a mouthpiece of rectangular cross section is used, and then the edge of the blade is preferably inclined to the upper edge of the mouth in order to obtain a slicing action during the cut.

In order to alter the number of cuts per inch of feed, it is only necessary to alter the relative speeds of the feed and the cutter.

If desired, however, means may be provided for varying the angle between the rotary axes of the shafts and the direction of motion of the tobacco leaves through the mouthpiece, so that the path traced by the edge of the blade during cutting may

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be varied when the number of cuts per inch is altered. The blade may be adjustable relative to the connecting rod so that it may be reset parallel to the face of the mouthpiece. By this means the movement of the blade in the direction of movement of the tobacco leaves through the mouthpiece may be made to approximate to the speed of feed of the tobacco leaves, thereby obtaining a substantially square or true cut for different feeds.

Alternatively this effect may be obtained by adjusting the position of the blade relative to the connecting rod, so that for different feeds the cutting operation shall take place at different parts of the circular motion of the shafts.

The mouthpiece may comprise a movably mounted upper member which rises and falls in accordance with the varying thickness of the tobacco leaves that are fed therethrough.

In the above construction the feed of the tobacco through the mouthpiece is preferably continuous, but an intermittent feed may be used if desired.

In a modification, the axes of the crankshafts are arranged at right angles to the front surface of the mouthpiece which is substantially a plane. The connecting rod is formed as a yoke carrying two sub-

stantially parallel blades, the cutting edges of the blades being arranged on their inner sides facing one another so that one blade cuts when the connecting rod moves in one direction, and the other blade cuts when the connecting rod is moving in the opposite direction.

Preferably the edges of the blades are substantially horizontal so that the bottom blade cuts when moving upwards and the top blade cuts when moving downward.

The blades are preferably set at an angle to the front surface of the mouthpiece to facilitate clearance during the cut, but the blades may be parallel to the front surface of the mouthpiece if desired.

The arrangement is such that both blades are clear of the mouthpiece (one being above it and the other below for instance) during certain parts of the movement, and the feed of the tobacco leaves through the mouthpiece takes place at these times, such feed being intermittent.

The mouthpiece may comprise a movably mounted upper member as in the construction previously described.

Dated this 13th day of April, 1928.

JOHNSONS & WILLCOX,  
47, Lincoln's Inn Fields, W.C. 2,  
Agents.

#### COMPLETE SPECIFICATION.

#### Improvements in or relating to Machines for Cutting or Shredding Tobacco.

We, THE IMPERIAL TOBACCO COMPANY (OF GREAT BRITAIN AND IRELAND) LIMITED, a British Company, of East Street, Bedminster, in the City and County of Bristol, and ALBERT FREDERICK COATES, a British subject, of Codrington Grange, Broadway Road, in the City and County of Bristol, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to machines for cutting or shredding tobacco of the type in which the tobacco is cut into flakes, or shreds, by a moving cutter as it issues through a mouthpiece.

One of the objects of this invention is to provide a mounting for the cutter that shall not subject the machine to heavy vibrating forces during its operation.

Another object is to provide a cutter that shall operate upon the tobacco with a draw-cut action instead of with a plain shearing action.

The present invention consists in an

improved machine for cutting tobacco into flakes, or shreds, in which the cutter is mounted upon a coupling element joining two rotating cranked axles or shafts, the feeding of the material through the mouthpiece being continuous and the edge of the cutter being out of square with the rotary axes of the said cranked axles or shafts.

The present invention further consists in an improved machine for cutting tobacco into flakes, or shreds, in which the feeding of the tobacco leaves through the mouthpiece is continuous and the cutter moves in a plane in a closed path or circuit, the edge of the cutters being inclined at less than a right angle to the said plane, so that a draw-cut is effected and the cutting edge is brought clear of the tobacco leaves when the said cutting edge traverses the mouthpiece after cutting.

One constructional form of improved tobacco cutting machine is diagrammatically indicated in the accompanying drawings, in which:—

Fig. 1 is a plan view of the machine.

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Fig. 2 is a front view, with certain up-right supports on the main bed of the machine cut away.

Fig. 3 is a longitudinal vertical section on the line 3—3 of Fig. 1.

Fig. 4 diagrammatically indicates the path traced by the knife relative to the mouthpiece. The various positions of the knife correspond to different points along the cutting edge.

The machine comprises a main bed 1 within which are rotatably mounted rollers 2, 3, 4, 5, 6 and 7. A lower belt 8 passes around rollers 2, 3 and 4, and an upper belt 9 passes around rollers 5, 6 and 7, said belts providing a channel 10 through which the tobacco may be passed and compressed so that it is forced through a mouthpiece 11.

In front of the mouthpiece is a cutter 12 mounted as hereinafter described which cuts the tobacco into flakes or shreds as it issues from the mouthpiece.

Secured to the main bed 1 is a frame 13 comprising a horizontal plate portion 14 extending transversely of the machine, with forwardly extending plate portions 15 and 16 at its ends.

Secured to or formed integral with the plate portion 14 are depending boxlike elements 17 and 18, and secured to the portions 15 and 16 respectively are brackets 19 and 20. Rotatably mounted upon the main bed of the machine is a driving shaft 21 extending into the boxlike element 18. A shaft 22 is rotatably mounted within the boxlike elements 17 and 18 and is provided with a bevel wheel 23 engaging with a bevel wheel 24 on the shaft 21. Rotatably mounted within the boxlike element 17 and the bracket 19 is a cranked axle or shaft 25 comprising main bearing portions 26 and 27 and webs 28 and 29 carrying the crank axle portion 30, while a similar cranked axle or shaft 31 with main bearing portions 32, 33, webs 34, 35 and crank axle portion 36 is rotatably mounted within the boxlike element 18 and the bracket 20.

The cranked axles or shafts 25, 31 are driven from the shaft 22 by bevel gears 37, 38 and 39, 40 respectively.

Connecting the crank axle portions 30, 36 is a coupling rod 41 which carries a bar 42.

Ears or lugs 43, 44 at the ends of the bar 42 serve to connect it to the coupling rod 41, the ears 44 being pivotally connected to the coupling rod 41 by the pin 45, while a pin 46 through the coupling rod 41 loosely engages in elongated slots 47 in the ears 43.

The cutter 12 hereinbefore referred to is formed as a plate like knife and is secured between the coupling rod 41 and

the bar 42 by clamping screws 48, 49 engaging in threaded holes in the coupling rod. The bar 42 may be adjusted at different angles to the coupling rod by means of screws 50, 51 engaging in threaded holes in the ears 43 and bearing at their ends against the pin 46. A loose packing bar 52 may be interposed between the screws 48, 49 and the knife 12 in order to improve the clamping action of the screws 48, 49. The cutting edge of the knife 12 is indicated by 53. The cranked axles or shafts 25, 31 may be provided with balance weights 57 to counterbalance part or the whole of the weight of the moving coupling rod 41 and elements carried thereby.

The frame 13 may be adjustably mounted upon the main bed or casing 1 of the machine so as to vary the direction of the rotary axes of the cranked axles or shafts 25, 31. For instance the boxlike element 18 of the frame 13 may be supported by a footstep bearing provided on a bracket 54, on the main bed or casing 1 of the machine in such a way that the said boxlike element 18 may be pivotally adjusted about the rotary axis of the driving shaft 21. After each adjustment it is understood that the frame 14 is clamped or otherwise secured to the casing 1, for instance by bolts 55 passing through the horizontal plate portion 14.

In Figs. 1 and 3, 58 indicates the up-right supports on the main bed of the machine that have been omitted from Fig. 2 for clearness.

The operation of the machine is as follows:—

The frame 13 is set slightly out of square with the main bed or casing 1 of the machine so that the rotary axes of the cranked axles or shafts 25, 31 are also out of square with said main bed or casing.

The bar 42 is then set by means of the screws 50, 51 so that it is square with the main bed or casing 1 of the machine and therefore out of square with the rotary axes of the cranked axles or shafts 25, 31.

The knife or cutter 12 is then clamped against the bar 42 by means of the screws 48, 49.

The rollers 2, 5 are driven continuously by suitable driving means (not shown) and the driving shaft 21 causes the cranked axles or shafts 25, 31 to rotate, carrying the coupling rod 41 and the knife 12 which thus has a circular movement imparted to it in a plane inclined to the cutting edge 53 of the knife. The edge of the knife 53 traces a surface whose cross section as viewed in Figure 4 is an ellipse. The front surface 56 of the mouthpiece 11 may be formed to correspond with the surface traced by the edge 53.

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During the rotary movement of the Knife 12, its edge 53 first moves downward across and close to the front surface 56 of the mouthpiece to cut the tobacco as it issues from the mouthpiece, but the edge 53 is spaced from the front surface 56 of the mouthpiece as it moves upwards, and thus the knife does not foul the tobacco as it issues from the mouthpiece on its upward movement. It will be observed that towards the end of its cutting action, the knife or cutter 12 has a considerable component of motion in the direction of its length in order to effect a draw-cut. Preferably the cutter 12 is constituted by a blade inclined to the front surface 56 of the mouthpiece in order to facilitate clearance during cutting.

When the number of cuts per inch is altered, the frame 13 may if desired be set at a different angle in order to modify the elliptical path traced by the cutting edge of the knife (as viewed in cross section in Fig. 4) and after adjusting the frame the knife 12 must be brought back square with the mouthpiece 11.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. An improved machine for cutting tobacco into flakes, or shreds, of the type hereinbefore referred to, in which the cutter is mounted upon a coupling element joining two rotating cranked axles or shafts, the feeding of the tobacco leaves through the mouthpiece being continuous, and the edge of the cutter being out of square with the rotary axes of said cranked axles or shafts.

2. An improved machine for cutting tobacco into flakes, or shreds of the type hereinbefore referred to, in which the feeding of the tobacco leaves through the mouthpiece is continuous and the cutter moves in a plane in a closed path or circuit, the edge of the cutter being inclined at less than a right angle to the said plane, so that a draw-cut is effected and the cutting edges is brought clear of the tobacco

leaves when the next cutting edge traverses the mouthpiece after cutting.

3. A machine as claimed in claim 1, in which the cranked axles or shafts are provided with balance weights to counter-balance part or the whole of the weight of the moving coupling rod and elements carried thereby.

4. A machine as claimed in any of the preceding claims in which the front surface of the mouthpiece corresponds substantially with part of the path traced by the edge of the cutter.

5. A machine as claimed in claim 1 in which means are provided for varying the direction of the rotary axes of the cranked axles or shafts.

6. A machine as claimed in claim 5, in which the cranked axles or shafts are mounted upon a frame which is adjustably mounted upon the main bed of the machine.

7. A machine as claimed in claim 5 or 6 in which the cutter is adjustably mounted upon the coupling element, so that it may be brought square with the front surface of the mouthpiece for different settings of the rotary axes of the cranked axles or shafts.

8. A machine as claimed in any of the preceding claims, in which the arrangement is such that towards the end of its cutting action, the cutter has a considerable component of motion in the direction of its length in order to effect a draw-cut.

9. A machine as claimed in any of the preceding claims, in which the cutter comprises a blade inclined to the front surface of the mouthpiece in order to facilitate clearance during cutting.

10. The improved machine for cutting or shredding tobacco into flakes, or shreds constructed and operating substantially as hereinbefore described and as illustrated in the accompanying drawings.

Dated this 11th day of February, 1929.

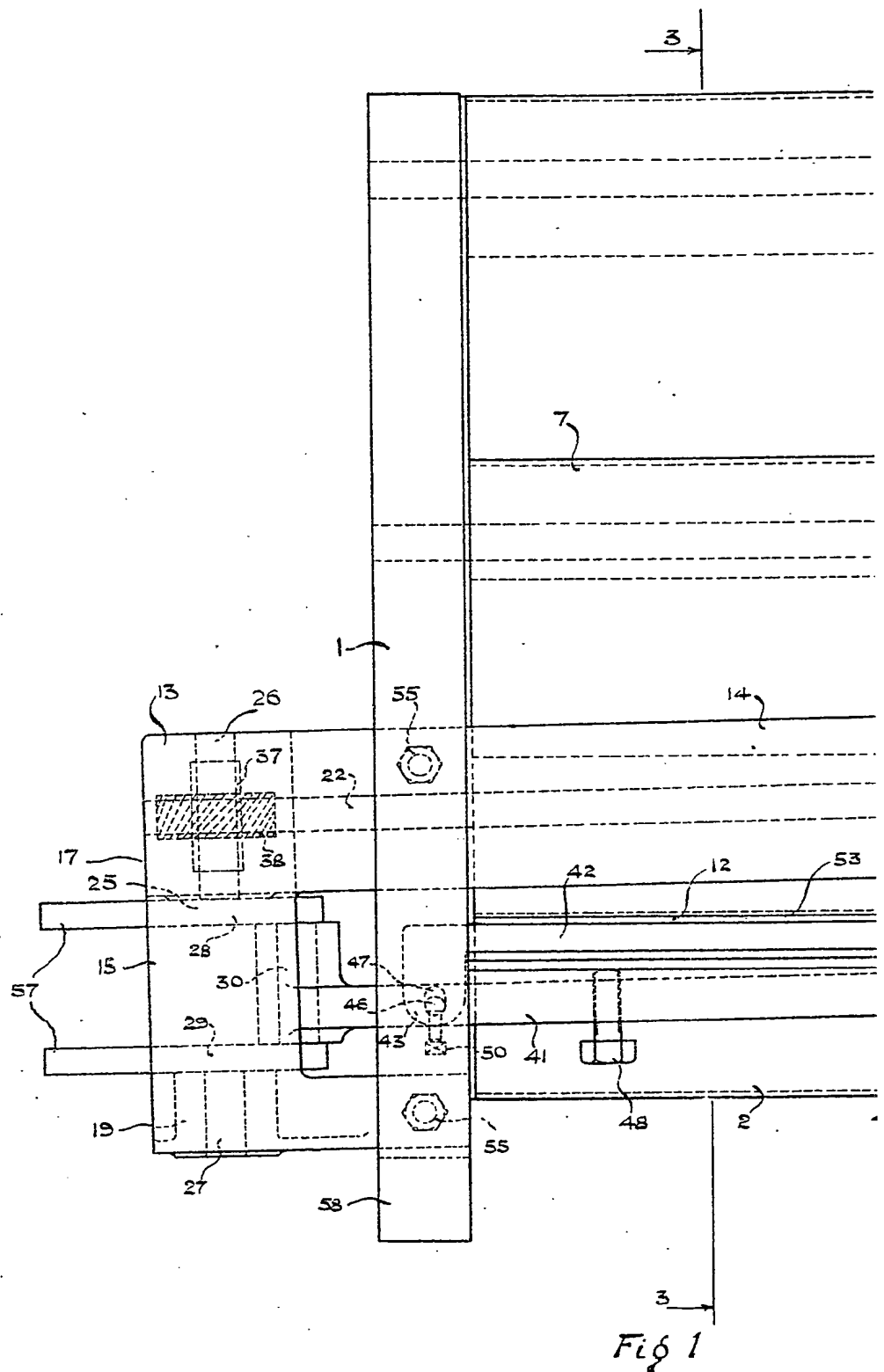
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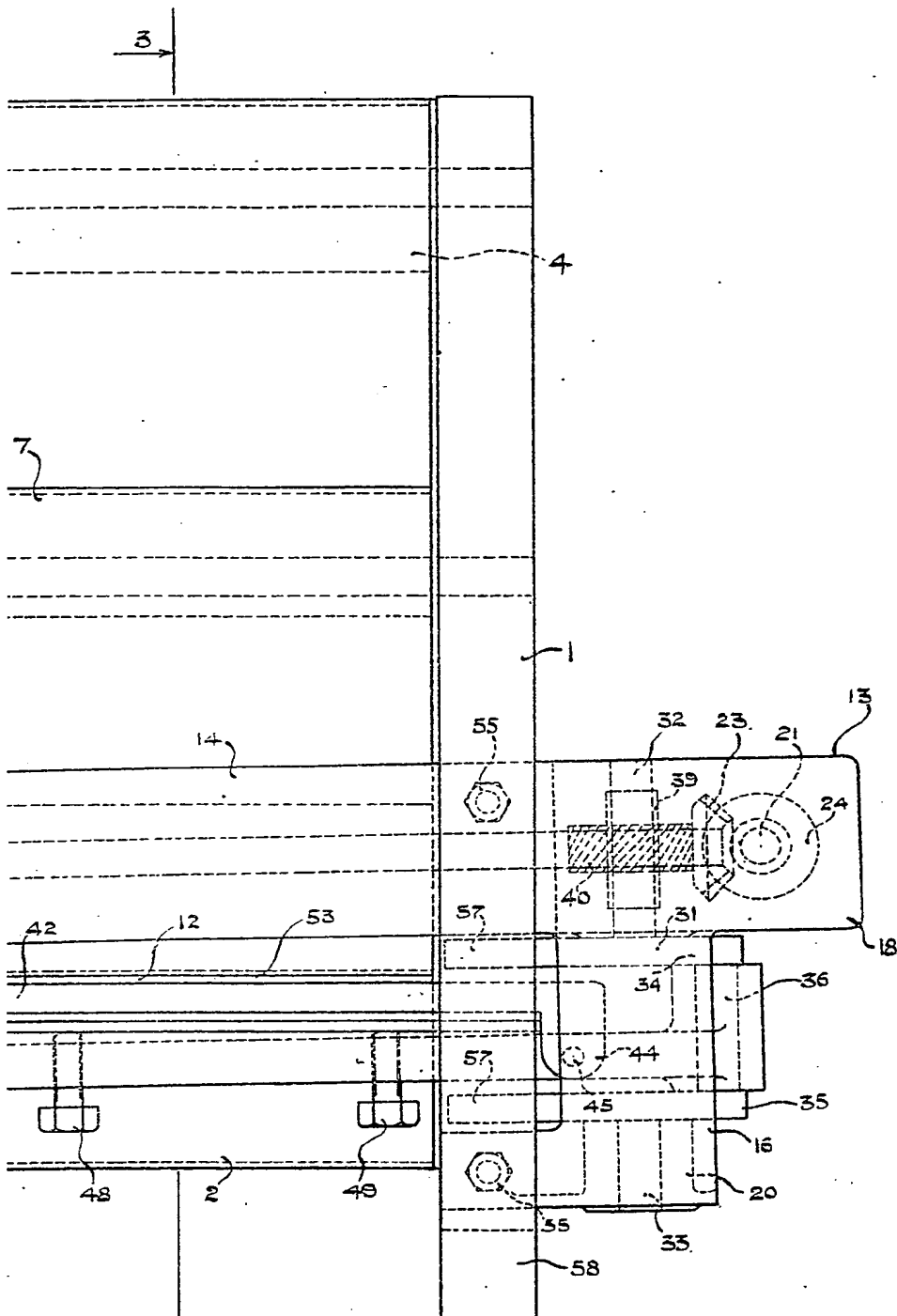


Fig 1

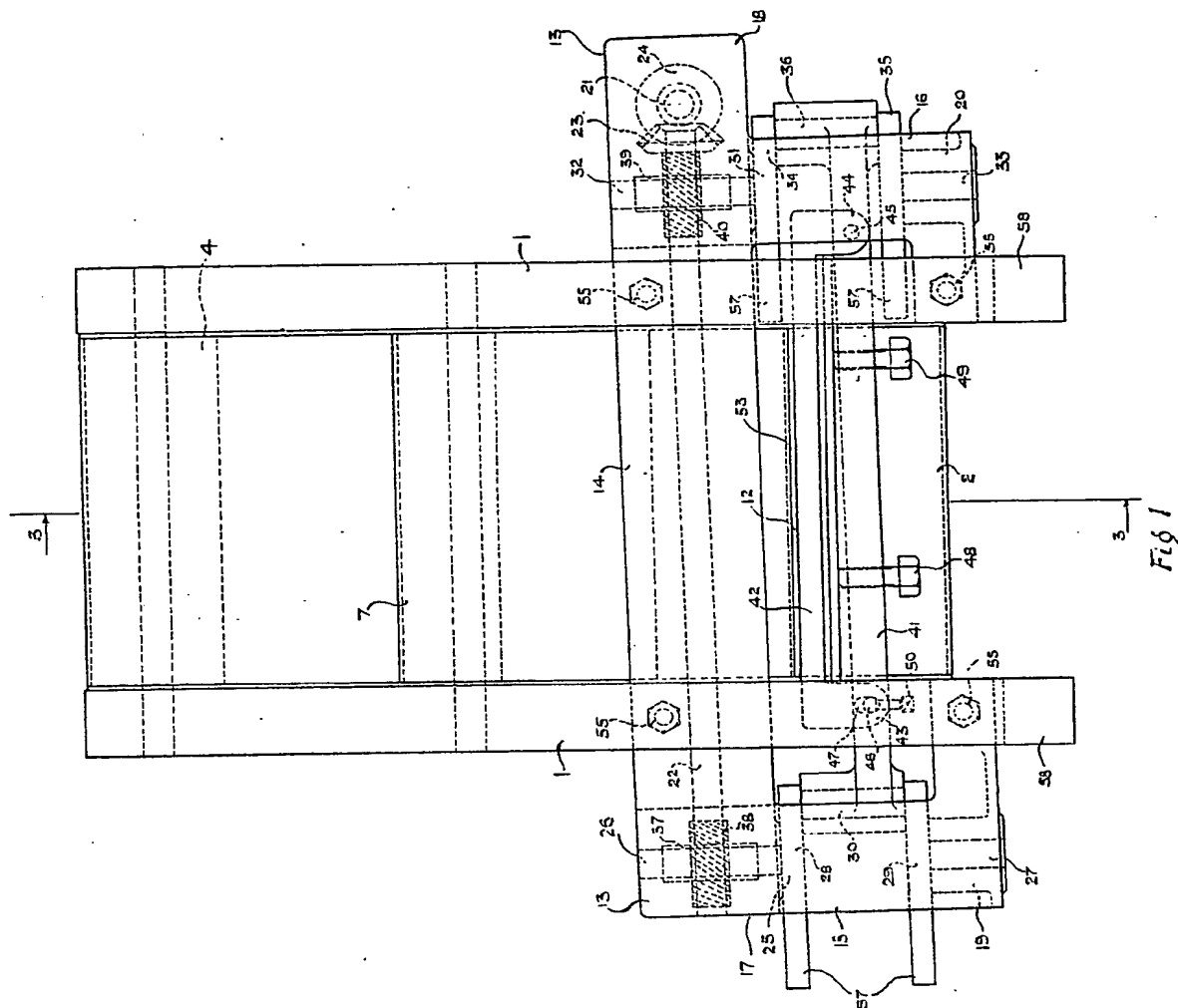


Fig 1

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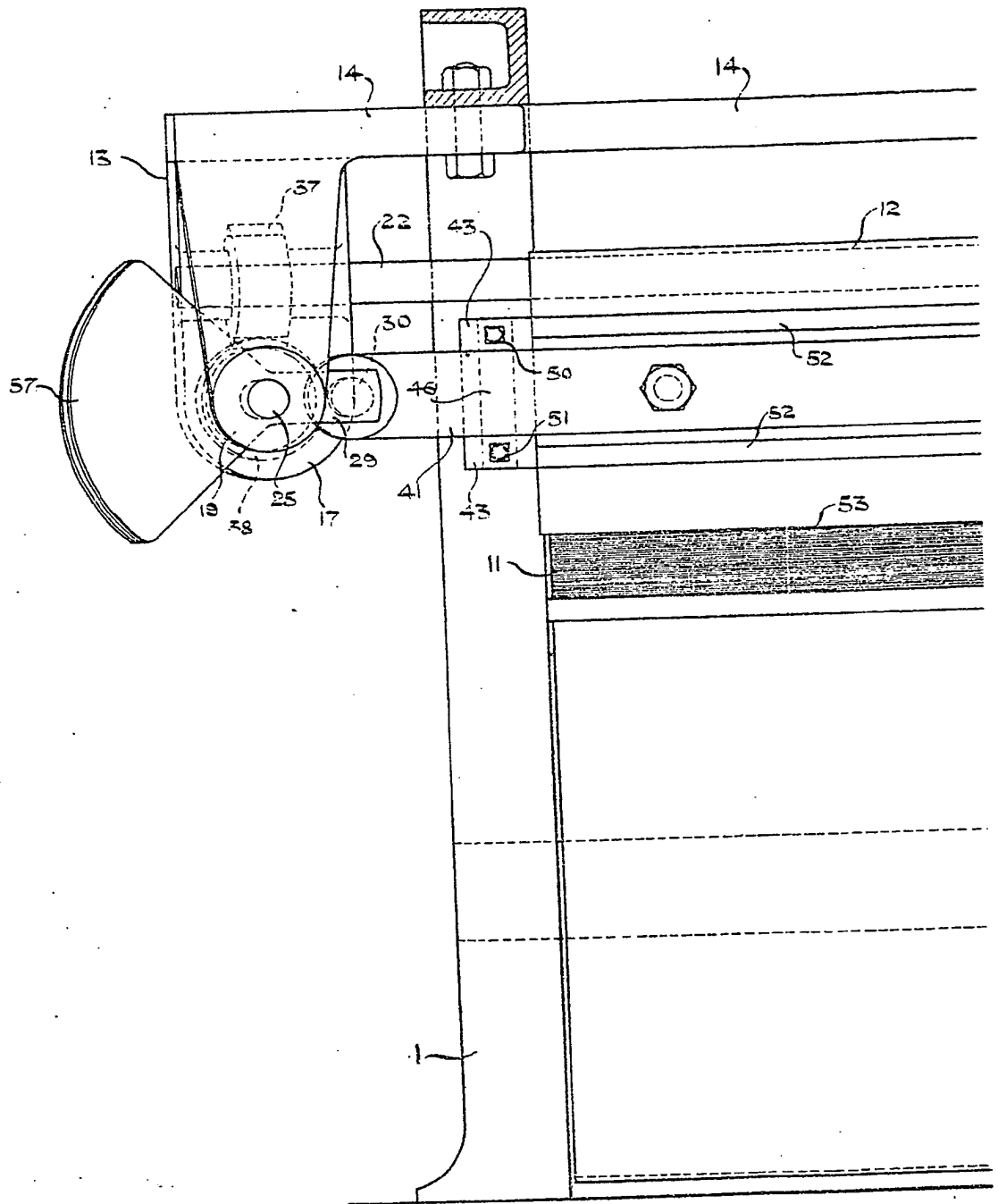


Fig. 2

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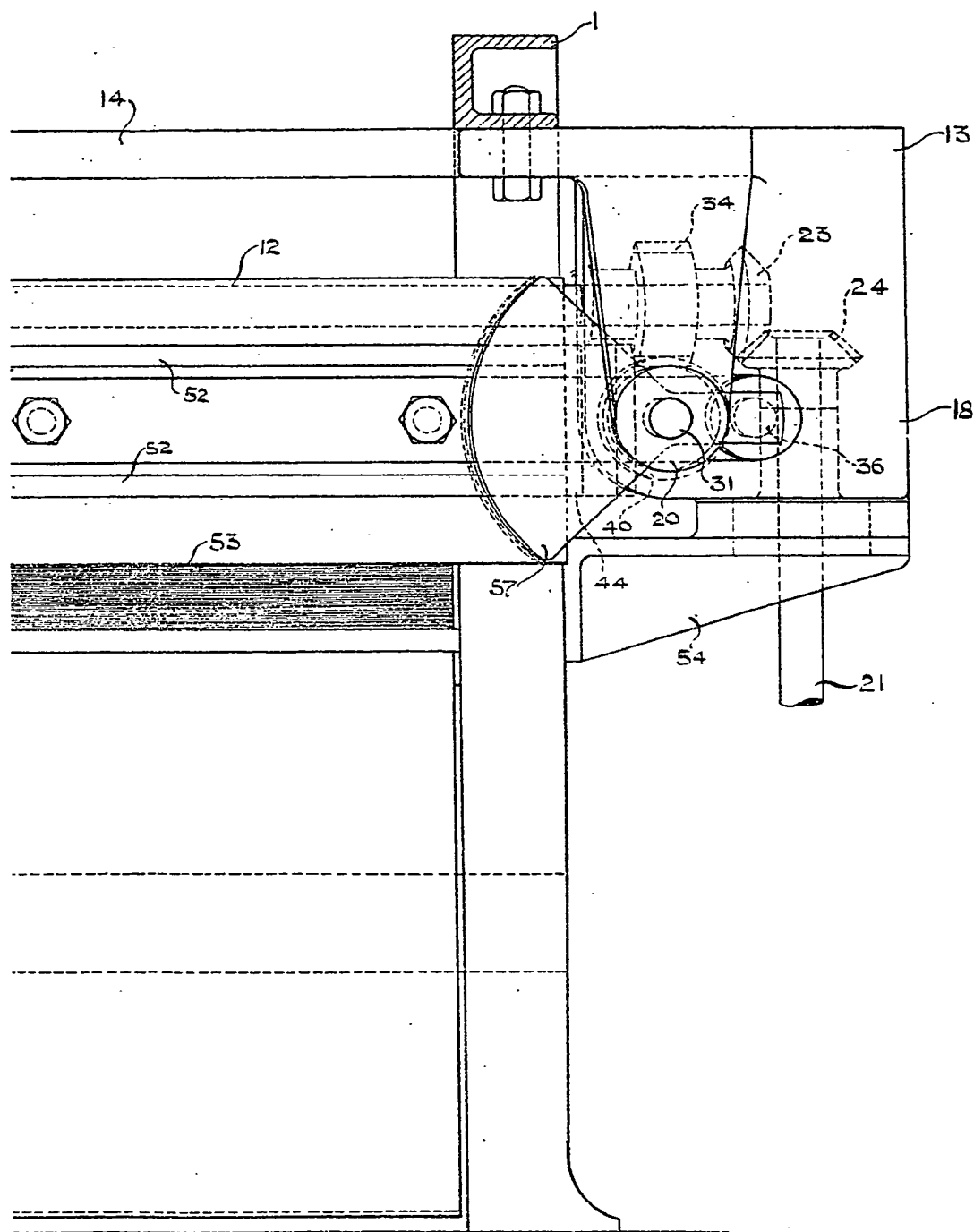


Fig. 2

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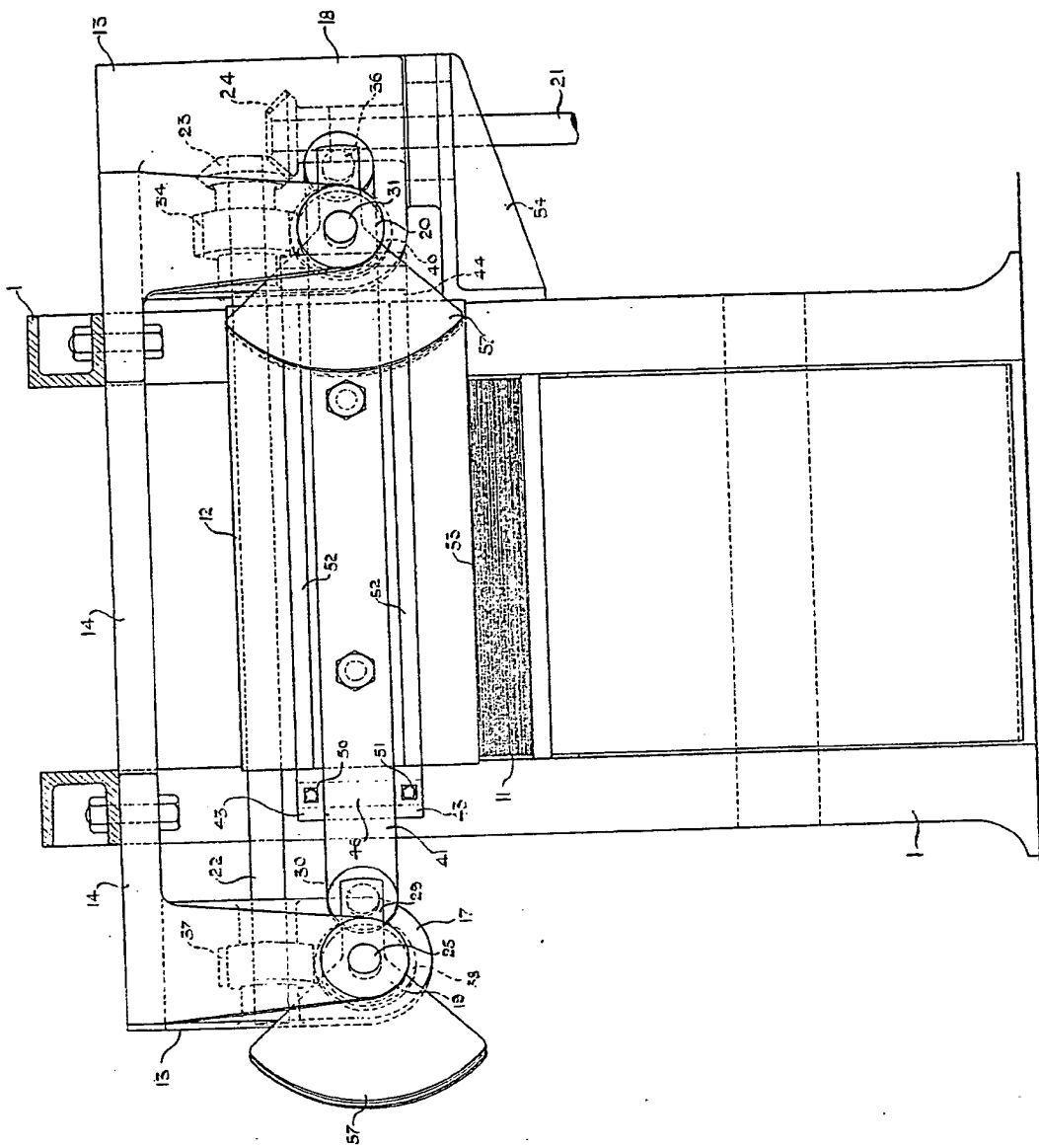


Fig. 2

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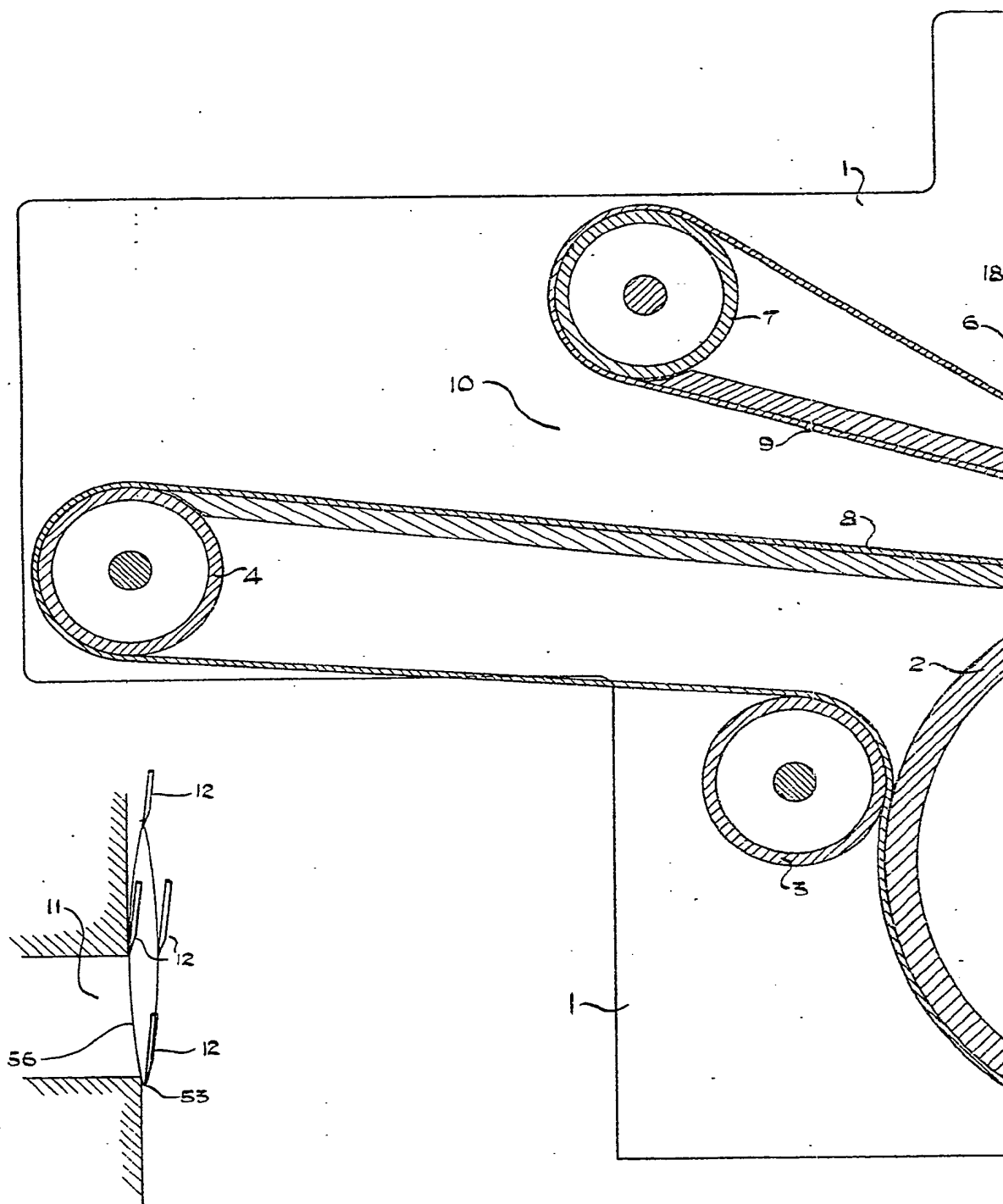


Fig. 4.

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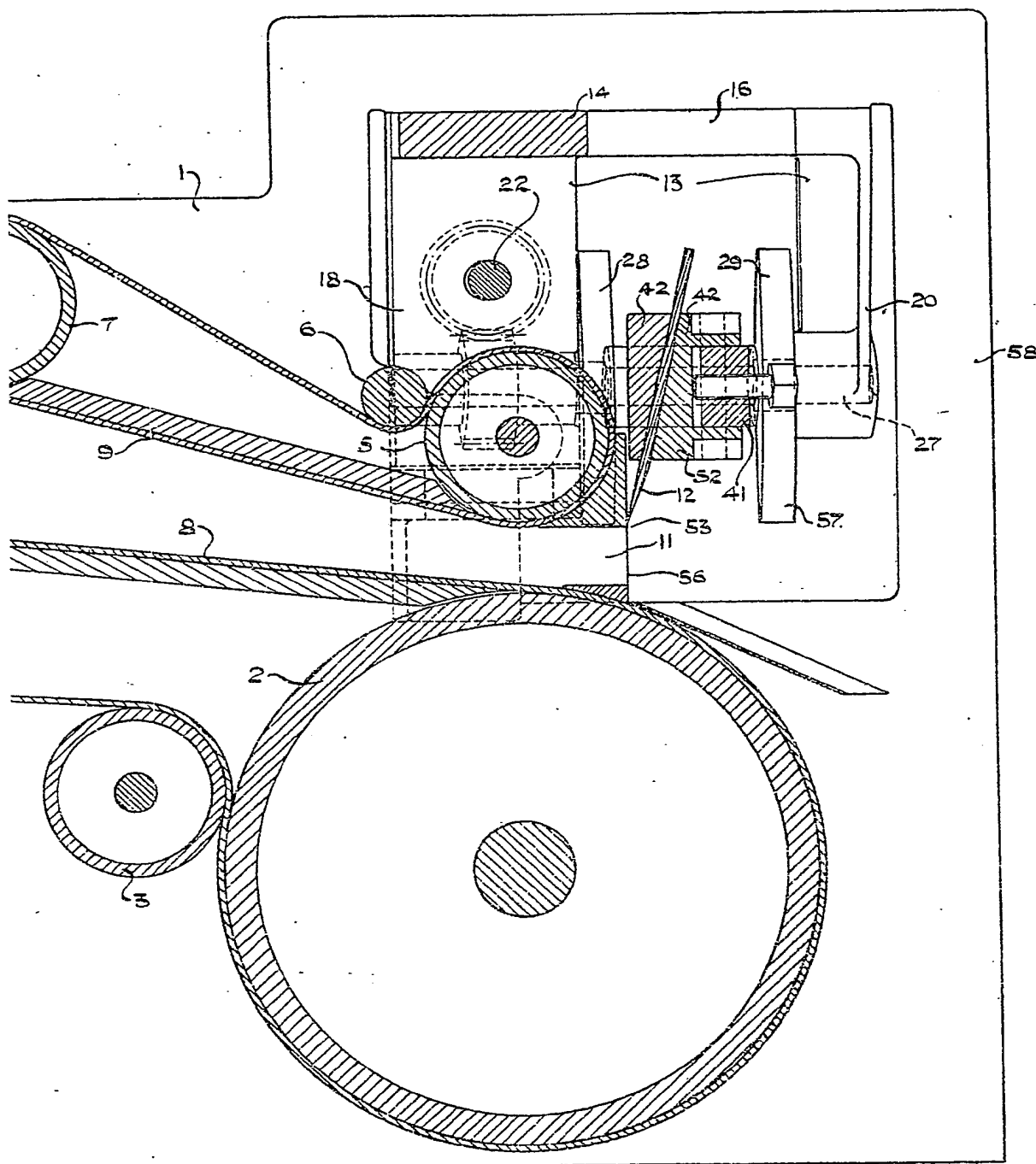


Fig 3.

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8 SHEETS  
SHEET 3

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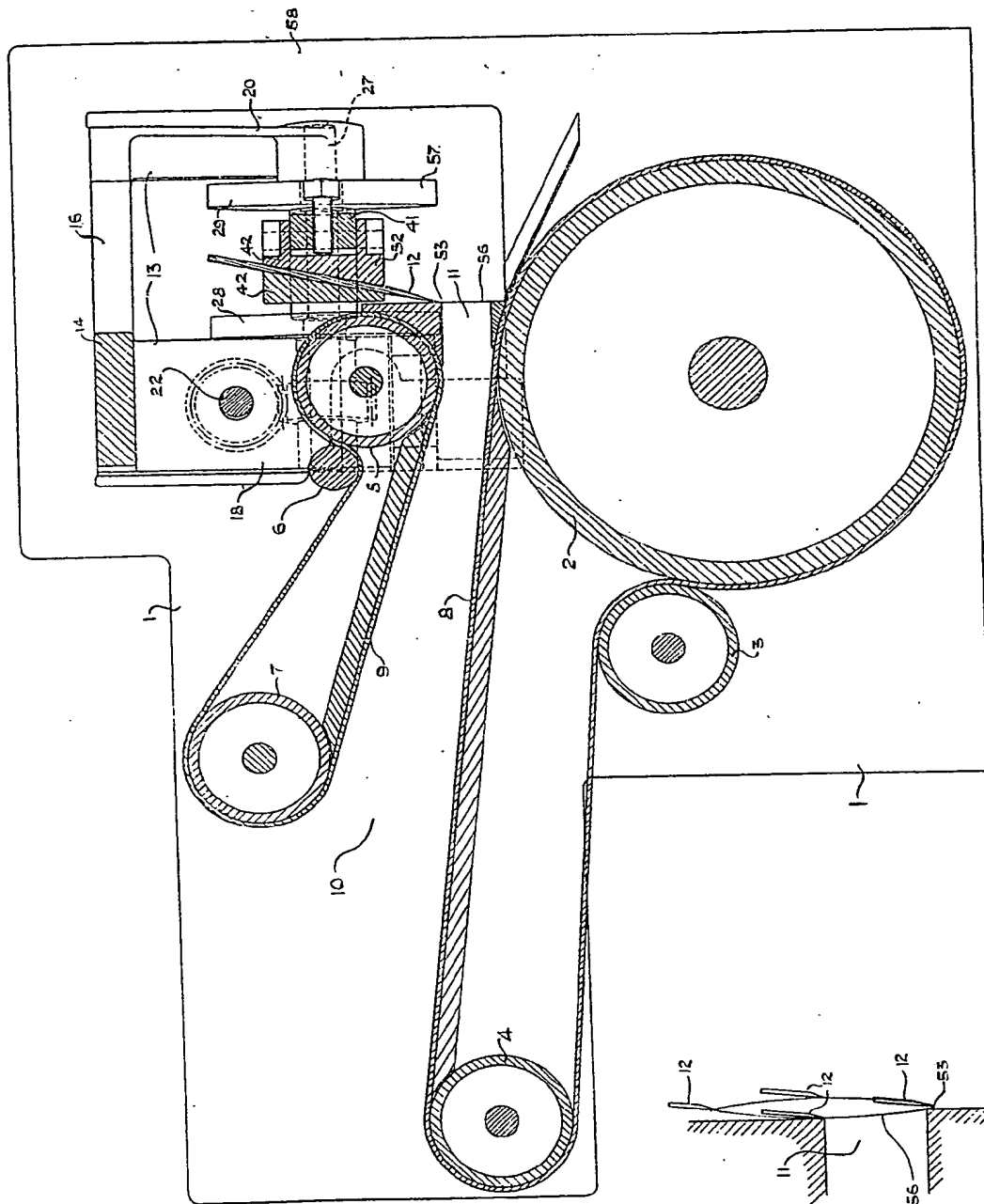


Fig 3

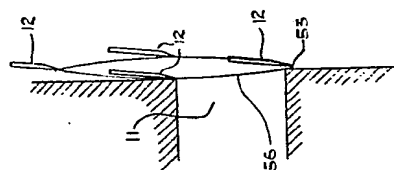


Fig 4

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